The Effects of Workplace Health Promotion on Absenteeism and Employment Costs in a Large Industrial Population

ROBERT L. BERTERA, DRPH

Abstract: We evaluated the impact of a comprehensive workplace health promotion program on absences among full-time employees in a large, multi-location, diversified industrial company. A pretest-posttest control group design was used to study 41 intervention sites and 19 control sites with 29,315 and 14,573 hourly employees, respectively. Blue-collar employees at intervention sites experienced an 14.0 percent decline in disability days over two years versus a 5.8 percent decline at control sites. This resulted in a net difference of 11,726 fewer disability days over two years at program sites compared with non-program sites. Savings due to lower disability costs at intervention sites offset program costs in the first year, and provided a return of $2.05 for every dollar invested in the program by the end of the second year. These results suggest that comprehensive workplace health promotion programs can reduce disability days among blue collar employees and provide a good return on investment. (*Am J Public Health* 1990; 80:1101–1105.)

Introduction

Health education has significant potential for reducing risk factors.[1–13] The effectiveness of workplace health promotion programs in reducing health risks has been demonstrated in the areas of high blood pressure control[14–16] and smoking cessation.[17–19] The evidence is more tentative in other areas of lifestyle change.[20–35]

Health education in the workplace is growing rapidly, driven by the promise of providing several non-economic,[33,36–38] as well as economic benefits.[18,38–44] Some authors emphasize the need for cost benefit and cost effectiveness analyses in order to examine the cost-effectiveness of workplace health promotion.[18,37,40,41,45] Others point out the limitations to the existing literature.[38,39,41]

The purpose of this study was to evaluate the impact of a comprehensive workplace health promotion program on illness absences not related to occupational causes.

Methods

Program Description

The program includes five core elements: training for site coordinators; a Health Promotion Activity Committee (HealthPAC); Orientation and Publicity; Health Risk Appraisal; and a variety of self-directed and group health education opportunities. These were first pilot tested in 1981 and 1982 at two manufacturing locations, refined, and then offered at the 41 intervention sites beginning in late 1983 and early 1984.

The program is introduced and administered by a network of site and departmental coordinators. Approximately 60 percent of these individuals are non-medical personnel selected for their communication skills, interest in health enhancement, and organizational abilities; in most cases, they serve part time in conjunction with their regular jobs. The remaining 40 percent are site medical personnel including nurses, physicians, and physician assistants.

At each location, a Health Promotion Activity Committee (HealthPAC) consisting of five to 15 employees from all levels of the organization assists in planning, publicity, and implementation.

The corporate health promotion staff offers a variety of three-day workshops designed to provide program guidelines, materials, and support for coordinators and HealthPACs. A quarterly newsletter keeps coordinators, committee members and management informed about site activities, new programs, and progress toward program objectives.

All program participants complete a voluntary, computer-scored health risk survey (available on request to author) containing 36 items on health status, personal habits, and lifestyle. Assistance is provided for interpreting appraisal results in groups using a videotape explanation, and individually through consultation with site medical personnel for all employees who request it. A copy of the appraisal is filed with the medical record for review during periodic medical evaluations which are offered to all employees at one, two, or three year intervals, based on age.

Health promotion activities include a variety of group and self-directed opportunities. Four- to 10-week class cycles provide opportunities at lunchtime or after shift to raise awareness or learn new skills. Topics for group and self-directed programs include smoking cessation, fitness, weight control, lipid control, stress management, and healthy back.

All employees receive a bi-monthly health and fitness magazine that helps keep employees and family members informed about current health and wellness developments. Challenges and incentive programs attempt to involve large numbers of employees in fitness, weight control, and smoking cessation activities. Cafeterias and vending machines offer heart healthy foods. Employees can check and record their own blood pressure and weight at machines and scales located in high traffic locations.

Certain program components were offered on company time including: program orientation activities, Health Risk Appraisal meetings, individual counseling, and health promotion activities presented to employees during safety meetings. The time allowed for these activities varied from 30 minutes to three hours, depending on employee interest and site commitment to employee health improvement. All employees must attend regular safety meetings on company time. Some of these meetings introduce and reinforce topics important to employee wellness such as: stress management, dental health, weight control, fitness, healthy back, high blood pressure control, nutrition guidelines, and smoking cessation. Safety meetings usually occur at least monthly and last from 15 to 60 minutes.

Address reprint requests to Robert L. Bertera, DrPH, Manager, Health Promotion Programs, Employee Relations Department, Medical Division, N-11400, Du Pont Company, Wilmington, DE 19898. This paper, submitted to the Journal March 30, 1989, was revised and accepted for publication February 12, 1990.

Program Costs and Benefits

Actual program costs, disability wage costs, and disability wage savings were analyzed for the baseline year and two program years. Health promotion program costs include all expenses in 1986 dollars for: staff and committee time; instructors and group leaders; educational materials; publicity and promotion; health risk appraisals; and recognition awards and incentives. Program costs did not include: office space and utilities; fitness equipment (only a few sites had any at the time of the study); and the value of employee time when attending activities during working hours.

Disability wage costs included actual wages and benefits paid to hourly employees in 1986 dollars for days of absence due to illness. Savings were calculated as the difference between disability wages paid at the end of the first and second program years subtracted from disability wages paid in the baseline year, prior to the program's introduction. Disability wage costs and savings exclude other costs that may be related to absenteeism such as health care claims and replacement worker expenses.

Study Population and Design

The study population consisted of hourly employees who were part of the US workforce in a large, diversified manufacturing company. White collar employees were excluded from the study because the major outcome measure—disability days due to non-occupational illness—was recorded only for hourly employees. The hourly workforce had the following characteristics: more than three-fourths (82.7 percent) male; 16.1 percent Black; and more than one-third (41.0 percent) were 40 or more years of age.

We used a pretest-posttest equivalent control group design.[46] Out of 100 locations that were providing comprehensive health promotion services, 60 were included in this study because they had at least 100 hourly employees on site. This excluded smaller sites from the study such as unit plants, warehouses, and transfer depots, as well as predominantly white collar locations such as sales offices, service units, and research centers. All study sites followed consistent policies on disability leave and reporting throughout the study. Although site-specific data on turnover rates were not available, the company has a long tradition of very low employee turnover.

The intervention sites consisted of 41 locations which elected to initiate the health promotion program by June 1985 and met the above inclusion criteria. All sites had to obtain prior approval to initiate the health promotion program by submitting a written implementation plan to the corporate health promotion manager. This review process made it possible to identify the study's control sites. The control sites consisted of 19 locations that had not adopted the program by June of 1985.

The two study groups were compared for equivalence on a number of demographic and social characteristics at baseline. The 41 program sites did not differ significantly from the 19 non-program sites in terms of the average number per site of: employees; males; employees 40 years of age or older; or the total number of hourly or salaried employees (Table 1).

The analysis is based on absenteeism data from 43,888 hourly employees from January 1984 through December 1986. The 41 program sites employed 29,315 hourly employees while the 19 non-program sites employed 14, 573 hourly employees.

TABLE 1—Demographic Profile Of Hourly Employees at Health Promotion Program Sites vs Non-program Sites

Mean Number per Site[a]	Study Groups[b]: Program Sites (N = 41)	Study Groups[b]: Non-Program Sites (N = 19)
Total Hourly Employees	715	767
Males	582	625
Age 40 or Older	325	324
Total Number of Hourly Employees	29,315	14,573
Total Number of Employees (Hourly and Salary)	42,435	22,116

[a]Based on 1984 averages per site for hourly employees except where noted as totals for the study group.
[b]No significant differences by t tests, 2 tail, separate variance estimate.

Unit of Analysis and Measurement of Outcomes

The primary outcome variable, using the sites as units of analysis, was the annual mean number of disability days per hourly employee. Days lost due to disability is defined as a measure of absenteeism that includes all illnesses not related to occupational causes. Disability days are recorded on time cards signed by supervisors and submitted to site time keepers for payroll purposes. Site disability days are reported quarterly to the corporate Compensation and Benefits Division which aggregates site data into annual reports.

Another outcome variable was the cost of wages, compensation, and benefits paid in 1986 dollars for days absent due to illness. For several years before this study began, all 60 study locations reported actual annual costs of wages, compensation, and benefits per hourly employee as part of an ongoing corporate accounting system separate from the health promotion program.

The health promotion program costs were obtained from two sources: 1) many items such as educational materials, supplies, health risk appraisals, and incentive awards were obtained from the corporate program, which provided expense records when sites were charged back for these goods and services; 2) sites were asked to submit annual budgets including information on staff and committee time. These sources were used to calculate the average annual program expenditures per hourly employee at each of the 41 intervention sites. The urban Consumer Price Index was used to convert health promotion program costs and disability wage costs into 1986 dollars and thus control for the effects of inflation from 1984 through 1986.

Results

The health promotion program began at the 41 intervention sites between November 1983 and June 1985. Most sites began the program in the first quarter of 1984; however, due to start-up delays, the program was actually available to employees an average of 20 months per site during the two-year study period.

Disability Days

As shown in Table 2, employees at program sites experienced a somewhat higher average number of days lost due to disability in the baseline year (1984). In the first year after the program was introduced (1985), the average number of disability days dropped 10.5 percent at program sites while it increased 1.9 percent at non-program sites.

TABLE 2—Mean Disability Days Lost by Hourly Employees by Program Year for Program and Non-program Sites

Year	Disability Days Lost by Study Group	
	Program Sites (N = 41)	Non-Program Sites (N = 19)
1984 (Baseline Pre-Program)	5.7	5.2
1985 (Year 1)	5.1	5.3
1986 (Year 2)	4.9	4.9
1984–1986 (decline)*	0.7	0.3

*Differences is 0.4 disability days (95 percent confidence interval 0.3, 0.5).

TABLE 3—Mean Disability Days by Hourly Employees Baseline Year (1984) vs Program Years One and Two for Sites with High vs Low Participation

Year	Disability Days Lost by Site Participation Level	
	High (N = 20)	Low (N = 21)
1984 (Baseline Pre-Program)	5.7	5.5
1985 (Year 1)	4.9	5.2
1986 (Year 2)	5.0	4.9
1984–1986 (decline)*	0.7	0.6

*Difference is 0.1 disability days (95 percent confidence interval 0.03, 0.23).

By the end of the second year, disability days dropped 14.0 percent at program sites and 5.8 percent at non-program sites. This represents 0.7 fewer disability days at program sites and 0.3 fewer days at non-program sites. The difference is 0.4 disability days per hourly employee (95 percent confidence interval 0.3, 0.5 days), which resulted in a savings of 11,726 fewer disability days at program sites compared with non-program sites over two years. This savings is the equivalent of 49 person years of effort that can be spent to produce goods and services.

The data suggest that the health promotion program had some influence on lowering disability days among hourly employees. It should be noted that other potential influences on disability statistics, such as early retirement programs and changes in medical insurance plans, were implemented simultaneously at both program and non-program locations during this period, thus providing some control for these external influences.

Disability Days by Participation Level

Although all 41 program sites met company health promotion guidelines (see Program Description, above), sites probably varied in the resources that they allocated to the program. Due to the number of sites, only limited anecdotal information was obtained in the course of the study to suggest resource variation as a confounding factor; one indirect indicator of how employees perceived the program was participation rates. Participation was measured by the number of employees who completed the Health Risk Survey form. Employees who completed the 36-item risk survey received a computer-scored Health Risk Appraisal within about 30 days.

Program sites where 50 percent or more of employees completed the Health Risk Survey had an average survey completion rate of 70.6 percent (CI = 69, 72), and are referred to as "High Participation" sites (N = 20). Program sites where less than 50 percent of employees completed the Health Risk Survey averaged only a 30 percent completion rate (CI = 26, 34), and are classified as "Low Participation" sites (N = 21).

One indicator that demonstrates differences in the intensity of program activity at high versus low participation sites was the variety of on-site classes offered. Sites that obtained a "high" response to the Health Risk Appraisal offered 6.2 topics, compared with 4.2 topics at low participation sites (difference 2.0, 95 percent CI = 1.56, 2.44).

As shown in Table 3, mean disability days declined in the first year by 14.0 percent at high participation sites and by 5.4 percent at low participation sites. By the end of the second year, disability days had declined 12.3 percent at program sites and 10.9 percent at non-program sites. This reflects a mean difference of 0.1 disability days (95 percent CI = 0.03, 0.23 days) between the two participation levels.

These data suggest that while higher participation was associated with greater declines in disability days in the first year, the association was not maintained in the second year. Table 4 indicates that there were about 50 percent more hourly employees at low participation than at high participation sites. It is possible that participation level was influenced by site size in a way that enabled smaller sites to gain higher participation and lower disability in the first year due to simplified start up logistics. By the second year, however, larger sites could have offered the program to more of their employees, thus reducing the first year differences that appeared to favor high participation sites. Another fact that supports this view is that indicators of participation were heavily dependent on first program year activity, again making it more likely that smaller sites would be classified as high participation sites.

Health promotion program costs were higher than in the first program year ($1.4 million) than the second year ($.7 million). This reflects higher initial investments of staff time, coordinator and committee time, training, publicity, and educational materials and incentives, some of which were not repeated in the second year. Savings due to lower disability costs were enough to offset program costs in the first year, where every dollar invested in health promotion yielded $1.11 in lower disability costs; in the second program year, every $1.00 spent on health promotion yielded disability savings of $2.05 (Table 5). Total return on investment over two years averaged $1.42 in lower disability wage costs for every $1.00 invested in health promotion.

TABLE 4—Demographic Indicators for Hourly Employees at Program Sites with Low vs High Participation

Mean Number per Site[a]	Site Participation Level[b]	
	High (N = 20)	Low (N = 19)
Total Hourly Employees	568	905
Males	446	759
Age 40 or Older	242	439
Total Number of Hourly Employees	11,927	18,110
Total Number of Employees (Hourly and Salary)	18,257	25,252

[a]Based on 1984 averages per site for hourly employees except where noted as totals for the study group.
[b]No significant differences by t tests, 2 tail, separate variance estimate.

TABLE 5—Program Costs and Disability Savings[a] by Program Participation Level and Year

Program Analysis	All Program Sites (N = 41 Sites)	Site Participation Level: Low (N = 21 Sites)	Site Participation Level: High (N = 20 Sites)
Year 1 (1985)			
Costs	$1,436,965	$ 736,031	$ 700,933
Savings	1,596,877	708,069	888,808
Return on Investment[b]	$1.11	$ .96	$1.27
Year 2 (1986)			
Costs	$ 714,312	$ 366,075	$ 348,237
Savings	1,463,524	641,632	821,891
Return on Investment[b]	$2.05	$1.75	$2.36
Combined (1985 & 1986)			
Costs	$2,151,277	$1,102,107	$1,049,170
Savings	3,060,401	1,349,701	1,710,699
Return on Investment[b]	$1.42	$1.22	$1.63

[a]All Costs and Savings figures are in 1986 dollars.
[b]Based on disability savings divided by program costs.

Total return on investment over two years varied by program participation level, with high participation sites saving $1.63 in lower disability costs for every dollar invested over two years, versus $1.22 for low participation sites (Table 5).

These return-on-investment data are conservative estimates because they exclude other potential savings that may be associated with lower absenteeism including lower costs for: company health care claims; replacement workers; and employee out-of-pocket health care expenses.

Discussion

Intervention sites self-selected themselves by initiating comprehensive employee health promotion activities prior to June 1985. This decision may have been linked to factors that could have predisposed self-selected sites to reduce disability days through means other than health promotion.

If present, this bias could lead to over-estimating the potential impact of the program. Future studies could control this potential bias by randomly assigning sites to intervention and control conditions.

The control sites consisted of 19 locations that had not adopted the comprehensive program by June 1985. However, a few of the 19 control locations may have initiated portions of the program after June 1985 and thus received partial interventions from July 1985 through December 1986. This potentially dilutes the intervention effect which may have been reflected in the second-year absenteeism declines for control sites, and probably produces an underestimate of the program's potential impact. No systematic information was collected on the nature or extent of potential control site contamination. The extensive communication networks and decentralized decision-making in a large, diversified company makes it difficult to measure and control such effects.

Disability days were tracked for three years including the baseline year. Longer follow-up periods would be desirable to measure maintenance effects. Unfortunately, the tracking system for disability days was discarded in 1987 as part of a restructuring of human services resources within the company.

Site employee participation levels were estimated by the number who completed the health risk appraisal. This is an indirect but convenient measure of perceived interest and quality. While some evidence exists that the number of activities offered on the site is related to the risk appraisal completion, future studies should seek additional information on program participation, activities, and expenditures. The measurement and attribution of potential program impacts could also be improved by obtaining information on geographic or intergroup variations of employee turnover, job satisfaction, and other measures of attitudes or beliefs that could affect absenteeism patterns.

Recent published reports, while not using absenteeism as an outcome, have reported savings associated with comprehensive health promotion programs in the workplace. In a study of Johnson & Johnson's comprehensive approach, inpatient hospital insurance costs compared to controls[47] were nearly $1 million lower over five years. These savings were attributed to lower rates of increase in the number of hospital days and in the number of admissions among employees at program sites.

In a study of a comprehensive health promotion and wellness education at Blue Cross-Blue Shield subscriber companies, employees with the program claimed 24 percent fewer health insurance dollars over five years compared to similar employees who were not receiving the program.[48] The savings in lower health care insurance costs produced a return on investments of $1.45 for each dollar spent on the program.

These studies and our results suggest that comprehensive workplace health promotion programs can return $1.45 in lower hospital insurance costs and another $1.42 in lower disability wage costs for every dollar invested in health promotion. If these findings can be confirmed in other studies, it appears that health promotion programs are good business because they provide a favorable return on investment while helping to improve indicators of health among blue collar employees.

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USEPA to Sponsor International Symposium on Radon

The United States Environmental Protection Agency has announced the dates for the International Symposium on Radon and Radon Reduction Technology will be April 2–5, 1991, in Philadelphia, Pennsylvania, and has issued a call for papers with the theme being 'A New Decade of Progress.'

The symposium will provide a forum for the exchange of technical information on radon and radon reduction technology in the indoor environment. The major topics considered for the symposium will be: experience in the development and application of radon reduction and radon-resistant construction techniques, the measurement of radon and radon progeny, and the assessment of radon-derived health impacts.

Topics of greatest interest are: Radon Control, Measurement Methods (air and soil), Health Issues, Foreign and Domestic Radon Programs and Policy Issues, Radon Surveys, Public Information and Education, Radon in the Natural Environment.

Abstracts of 150 words or less should be submitted by September 30 to: Timothy M. Dyess, US-EPA, AEERL/Radon Mitigation Branch, MD-54, Research Triangle Park, NC 27711. Papers should provide study results; however, theoretical discussions of concepts and mechanisms will also be considered. Abstracts will be screened by the sponsors and papers will be solicited to cover areas of special concern. Notification of acceptance of papers will be done by November 15, 1990, after which the author will be required to submit an original and five copies of the paper by January 31, 1991.